State Board of Education Approved
February 2002

INTRODUCTION TO AEROSPACE

COURSE DESCRIPTION

Introduction to Aerospace is a course that introduces students to the knowledge and procedures required for the ground school (knowledge) portion of the Federal Aviation Administration (FAA) private pilot license examination. Students explore the history of aviation, career opportunities and paths within aviation, and the regulations governing those careers. The course also introduces principles of aeronautical decision making, airplane systems, and aerodynamics while preparing student for the course in *Flight Theory*. Course content prepares students for post secondary education and advancement in the aerospace industry.

Prerequisite(s): None

Recommended Credits: 1

Recommended Grade Level(s): 11 - 12

Note: Course must be taught by FAA certified instructor (Ground Instructor rating for those individuals teaching ground school only, FAA Flight Instructor certification is required for those individuals teaching flight instruction.) Flight Instructor certification qualifies individuals to teach ground school and flight instruction.

INTRODUCTION TO AEROSPACE STANDARDS

1.0 Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

2.0 Students will trace the history of aviation and how it relates to aviation today.

3.0 Students will analyze career opportunities and career paths in the global world of aviation and the regulations governing those careers.

4.0 Students will relate and apply mathematics and science concepts to aviation.

5.0 Students will analyze important aviation physiological factors and concepts pertaining to aeronautical decision making and judgment.

6.0 Students will examine airplane systems.

7.0 Students will demonstrate communication skills required in the aviation industry.

8.0 Students will demonstrate interpersonal and employability skills required in the aviation industry.

INTRODUCTION TO AEROSPACE

STANDARD 1.0

Students will demonstrate leadership, citizenship, and teamwork skills required for success in the school, community, and workplace.

LEARNING EXPECTATIONS

The student will:
1.1 Exhibit positive leadership skills.
1.2 Participate in SkillsUSA-VICA as an integral part of classroom instruction.
1.3 Assess situations and apply problem-solving and decision-making skills to particular client relations in the community, and workplace.
1.4 Demonstrate the ability to work cooperatively with others in a professional setting.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
1.1.A Demonstrates character, leadership, and integrity using creative and critical-thinking.
1.2.A Applies the points of the creed to personal and professional situations.
1.2.B Participates and conducts meetings and other business according to accepted rules of parliamentary procedure.
1.3.A Analyzes situations in the workplace and uses problem-solving techniques to solve the problem.
1.4.A Participates in a community service project.
1.4.B Assists with an officer campaign with Tennessee SkillsUSA-VICA.

SAMPLE PERFORMANCE TASKS

- Create a leadership inventory and use it to conduct a personal assessment.
- Participate in various SkillsUSA-VICA programs and/or competitive events.
- Evaluate an activity within the school, community, and/or workplace and project effects of the project.
- Implement an annual program of work.
- Prepare a meeting agenda for a SkillsUSA-VICA monthly meeting.
- Attend a professional organization meeting.
- Participate in the American Spirit Award competition with SkillsUSA-VICA.

INTEGRATION LINKAGES

SkillsUSA-VICA, *Professional Development Program,* SkillsUSA-VICA, Communications and Writing Skills, Teambuilding Skills, Research, Language Arts, Sociology, Psychology, Math, Math for Technology, Applied Communications, Social Studies, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, SCANS (Secretary's Commission on Achieving Necessary Skills), Chamber of Commerce, Colleges, Universities, Technology Centers, and Employment Agencies

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STANDARD 2.0

Students will trace the history of aviation and how it relates to aviation today.

LEARNING EXPECTATIONS

The student will:
2.1 Assess the evolution of the aviation industry.
2.2 Investigate people in history who helped to shape aviation history.
2.3 Analyze the influence of World Wars I and II on aviation.
2.4 Research select aircraft.
2.5 Examine the Jet Age.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
2.1.A Explores historical milestones in aviation history.
2.1.B Categorizes changes in the aviation industry and analyzes the effects of changes.
2.1.C Evaluates current trends in aviation and makes predictions about future trends.
2.2.A Conducts research including using electronic resources about key figures in aviation history.
2.2.B Presents findings in both oral and written presentations.
2.3.A Researches the role of aviation in World Wars I and II.
2.3.B Evaluates how the demands of war resulted in technological change in aviation.
2.4.A Conducts research including using electronic resources.
2.4.B Presents findings in both oral and written presentations.
2.5.A Compares and contrasts jet and nonjet aircraft.
2.5.B Evaluates the implications of the Jet Age.

SAMPLE PERFORMANCE TASKS

- Present an oral report on an individual who was influential in aviation history.
- Create a timeline showing major milestones in the history of aviation.

INTEGRATION/LINKAGES

Research and Writing Skills, History, Social Studies, Technology Literacy, Computer Skills, Applied Communication, Secretary's Commission on Achieving Necessary Skills, SkillsUSA-VICA, ATEC (Aviation Technical Education Council), Federal Aviation Administration (FAA)

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STANDARD 3.0

Students will analyze career opportunities and career paths in the global world of aviation and the regulations governing those careers.

LEARNING EXPECTATIONS

The student will:
3.1 Explore the titles, roles, and functions of individuals engaged in aviation careers.
3.2 Investigate employment opportunities.
3.3 Examine regulatory requirements affecting aviation careers.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
3.1.A Compares the roles and functions of the various careers available within the aviation industry.
3.1.B Evaluates opportunities for advancement in the various aviation career areas.
3.2 A Researches and develops a projection of industry trends related to career opportunities.
3.2.B Compares career plans for various career paths in the aviation industry.
3.3.A Accesses relevant Federal Aviation Administration (FAA) regulations.
3.3.B Analyzes Federal Aviation Administration (FAA) regulations that govern pilot licensing.
3.3.C Interprets the exercise of pilot privileges within prescribed limitations.

SAMPLE PERFORMANCE TASKS

- Develop a profile of career opportunities.
- Develop a personal career plan.
- Detail the federal requirements for a private pilot license.
- Appraise professional aviation organizations and explain their purposes and the ways the benefit the industry and its professionals.
- Research and present information on key individuals in the current aviation industry.
- Incorporate professional terminology into conversation during training activities.

INTEGRATION/LINKAGES

Research and Writing Skills, Career Exploration, Social Studies, Government, Technology Literacy, Computer Skills, Applied Communication, Secretary's Commission on Achieving Necessary Skills, SkillsUSA-VICA, Aviation Technical Education Council (ATEC), Federal Aviation Administration (FAA)

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STANDARD 4.0

Students will relate and apply mathematics and science concepts to aviation.

LEARNING EXPECTATIONS

The student will:
4.1 Correlate mathematical operations with aviation technology.
4.2 Process and interpret data related to aviation.
4.3 Examine the principles of aerodynamics.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
4.1.A Selects the appropriate mathematical operation for a given aviation function.
4.1.B Accurately performs mathematical computations.
4.2.A Interprets real data.
4.2.B Assesses the relationships between aviation and economic growth.
4.2.C Estimates probable and predictable outcomes.
4.3.A Identifies and analyzes the effects of the four basic forces acting upon airplanes (lift, gravity, thrust, and drag.)
4.3.B Expresses the relationship between speed, acceleration, lift, thrust, weight, and drag.
4.3.C Analyzes the importance of stability in steady flight.
4.3.D Determines the characteristics and implications of stall/spin.
4.4.E Deduces the importance of prompt recognition of stall indications.

SAMPLE PERFORMANCE TASKS

- Create a line graph showing the relationship between aviation industry growth and overall economic growth during a given period based on research using online government resources.
- Illustrate the importance of mathematics to aviation.
- Use a model to demonstrate basic aerodynamic principles.

INTEGRATION/LINKAGES

Mathematics, Economics, Government, Research and Writing Skills, Technology Literacy, Computer Skills, Applied Communication, Secretary's Commission on Achieving Necessary Skills, SkillsUSA-VICA, Aviation Technical Education Council (ATEC), Federal Aviation Administration (FAA)

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STANDARD 5.0

Students will analyze important aviation physiological factors and concepts pertaining to aeronautical decision making and judgment.

LEARNING EXPECTATIONS

The student will:
5.1 Explore the factors that affect aeronautical decision making.
5.2 Explore techniques for enhancing safety in the cockpit by improving pilot judgment and decision making skills.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
5.1.A Examines pilot-in-command responsibilities.
5.1.B Evaluates the role of communication in aviation.
5.2.A Analyzes and applies resource use concepts.
5.2.B Relates workload management practices to successful outcomes.
5.2.C Analyzes situational awareness factors.

SAMPLE PERFORMANCE TASKS

- Discuss the role of risk management in successful decision making.
- Complete a stress level self-assessment and discuss how stress management impacts pilot decision making.
- Research and present results on how physiological factors affected a specific flight accident.

INTEGRATION/LINKAGES

Science, Business, Technology Literacy, Applied Communication, Secretary's Commission on Achieving Necessary Skills, SkillsUSA-VICA, Aviation Technical Education Council (ATEC), Federal Aviation Administration (FAA)

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STANDARD 6.0

Students will examine airplane systems.

LEARNING EXPECTATIONS

The student will:
6.1 Analyze the structure of an airplane.
6.2 Examine flight instrumentation and power plant operations.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
6.1.A Illustrates the construction of airplanes.
6.1.B Distinguishes the basic components of most airplanes.
6.2.A Illustrates the operation and construction of flight and powerplant instruments and instrument systems.
6.2.B Analyzes instrumentation errors and common malfunctions.

SAMPLE PERFORMANCE TASKS

- Diagram the structure and components of an aircraft.
- Deduce and describe limitations of aircraft flight and powerplant instruments.

INTEGRATION/LINKAGES

Science, Mathematics, Technology Literacy, Applied Communication, Secretary's Commission on Achieving Necessary Skills, SkillsUSA-VICA, Aviation Technical Education Council (ATEC), Federal Aviation Administration (FAA)

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STANDARD 7.0
Students will demonstrate communication skills required in the aviation industry.

LEARNING EXPECTATIONS

The student will:
7.1 Communicate and comprehend oral and written information typically occurring in the aviation workplace.
7.2 Solve problems and make decisions using a logical process.
7.3 Use teamwork skills to accomplish goals, solve problems, and manage conflict within groups.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:
7.1.A Interprets and uses written information in common job formats, such as tables, charts, and reference materials and manuals.
7.1.B Interprets and uses graphical information such as blueprints, electrical schematics, process control schematics, and other diagrams.
7.1.C Uses electronic resources to obtain information.
7.1.D Analyzes information obtained from various sources to determine a diagnostic approach.
7.1.E Communicates clearly and appropriately in oral and written form.
7.2.A Develops a hypothesis regarding the cause of a problem.
7.2.B Tests the hypothesis to determine the solution to the problem.
7.2.C Creates, evaluates, and revises as needed a plan to resolve a problem.
7.3.A Serves in each of the functional roles of a team.
7.3.B Resolves conflicts within a group.
7.3.C Demonstrates appropriate and positive examples of giving and accepting criticism.
7.3.D Modifies behavior or revises work based on appropriate criticism.
7.3.E Solves problems in cooperation with other members of a group.

SAMPLE PERFORMANCE TASKS

- Use electronic reference materials to research a topic.
- Work as a team member to develop a problem-solving strategy.
- Use blueprints and diagrams to execute a task.

INTEGRATION/LINKAGES

Communication Skills, Teamwork Skills, Computer Skills, Reading and Writing Skills, Language Arts, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills, SkillsUSA-VICA

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STANDARD 8.0

Students will demonstrate interpersonal and employability skills required in the aviation industry.

LEARNING EXPECTATIONS

The student will:

8.1 Infer relationships between work ethics and organizational and personal job success.
8.2 Demonstrate attitudes conducive to workplace success.
8.3 Maintain a neat and orderly work area.
8.4 Assess implications of diversity for communities and workplaces.
8.5 Exhibit positive employability behaviors.
8.6 Develop individual time management and work sequencing skills.

PERFORMANCE STANDARDS: EVIDENCE STANDARD IS MET

The student:

8.1.A Illustrates the concept of a "work ethic."
8.1.B Assesses the potential impact of an individual's work ethic on an organizational system.
8.1.C Infers the relationship between work ethics and personal job success.
8.2.A Judges which attitudes are conducive to success.
8.2.B Modifies behavior to reflect attitudes for success.
8.3.A Keeps work area organized and free from clutter.
8.3.B Deduces the correlation between a clean orderly work environment and successful and efficient job performance.
8.4.A Points out benefits and problems that may arise from diversity in the workplace.
8.4.B Devises solutions to problems arising from diversity.
8.5.A Demonstrates proper dress for workplace.
8.5.B Demonstrates appropriate grooming for workplace.
8.6.A Assesses the benefits of incorporating time management principles into work.
8.6.B Displays time management and work sequencing skills in class assignments.

SAMPLE PERFORMANCE TASKS

- Maintain an orderly work area.
- Consistently arrive at class on time.
- Resolve an interpersonal conflict in the classroom.

INTEGRATION/LINKAGES

Communication Skills, Teamwork Skills, Computer Skills, Reading and Writing Skills, Language Arts, Problem Solving, Interpersonal Skills, Employability Skills, Critical-Thinking Skills, Secretary's Commission on Achieving Necessary Skills, SkillsUSA-VICA

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SAMPLING OF AVAILABLE RESOURCES

FAR Parts 1, 61, and 9, Federal Aviation Regulations */14 CFR - Chapter I - Part 141 - Appendix B,* Code of Federal Regulations

Private Pilot Test Prep: 2002 Edition, Federal Aviation Administration, Aviation Supplies & Academics

The Complete Private Pilot (The Complete Pilot Series) Aviation Book Co., 1997

Dictionary of Aeronautical Terms, Third Edition, Aviation Supplies & Academics

Study Guide for an Invitation to Fly: Basics for the Private Pilot, Wadsworth Pub Co, 1999

Fliers, Aviation Supplies & Academics

Confident Flying, Aviation Supplies & Academics